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## THE TENTH-EXPONENT

A METHOD of expressing large or small quantities in modern physical and chemical science is to write the number expressing the quantity as a factor of some power of 10. It is proposed to change this notation and write the exponent of 10 at the upper left-hand side of the factor and call this exponent *The Tenth-Exponent*. The base, 10, is omitted. The following numbers will illustrate this notation:  $1.872A \times 10^3 = {}^3 1.872A$ , number of electrons in any atom,  $A = \text{At. Wt.}$

$1.49 \times 10^{-17} = {}^{-17} 1.49$  ergs, average kinetic energy of the electrons in the H atom at  $0^\circ \text{C.}$

$3.4 \times 10^{10} = {}^{10} 3.4$  cm./sec., *mean square* of the velocity of the electrons in the H atom at  $0^\circ \text{C.}$

$4.0 \times 10^{13} = {}^{13} 4.0$  cm./sec., *mean square* of the velocity of the electrons in the H atom at  $3000^\circ \text{C.}$

$v/(6.062 \times 10^{23}) = v/{}^{23} 6.062$  cm.,<sup>3</sup> the volume required by any atom,

$$v = A/D; D = \text{density.}$$

$6.062/v \times 10^{23} = {}^{23} 6.062/v$  number of atoms of any element per cm.<sup>3</sup>

FRANK W. BALL

## CHEMICAL PUBLICATIONS

TO THE EDITOR OF SCIENCE: On page 169 of the current volume of SCIENCE (February 16, 1917), I note that the table gives in 1914-15, 29 publications on chemistry from Columbia University, and 6 under Columbia University and Roosevelt Hospital. The work of these six papers was all done in this department, and should therefore have been included in the table. This would change the number on page 170 for Columbia University from 29 to 35, and would place this department, as regards the number of articles, eighth on the list instead of tenth. It should be noted also that this table refers only to publications in American journals. A number of papers were published in foreign journals from this department during the same year.

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## QUOTATIONS

## SCIENTIFIC AND CLASSICAL EDUCATION

IF scientific men who have not had the time to follow up this educational controversy closely wish to grasp its essential values, they can not do better than weigh over the implications of this passage that follows, from an article by Lord Bryce in the current *Fortnightly Review*:

I do not contend that the study of the ancients is to be imposed on all, or even on the bulk, of those who remain at school till eighteen, or on most of those who enter a university. It is generally admitted that at the universities the present system can not be maintained. Even of those who enter Oxford or Cambridge, many have not the capacity or the taste to make it worth while for them to devote much time there to Greek and Latin. The real practical problem for all our universities is this: How are we to find means by which the study, while dropped for those who will never make much of it, may be retained, and for ever securely maintained, for that percentage of our youth, be it 20 or 30 per cent. or be it more, who will draw sufficient mental nourishment and stimulus from the study to make it an effective factor in their intellectual growth and an unceasing spring of enjoyment through the rest of life? This part of our youth has an importance for the nation not to be measured by its numbers. It is on the best minds that the strength of a nation depends, and more than half of these will find their proper province in letters and history. It is by the best minds that nations win and retain leadership. No pains can be too great that are spent on developing such minds to the finest point of efficiency.

We shall effect a saving if we drop that study of the ancient languages in the case of those who, after a trial, show no aptitude for them.

Let the scientific man read that over carefully, and, if need be, re-read it. Let him note first the invincible conceit of the classical scholar in the superiority of his particular education to any other, and his firm determination to secure the pick of the available boys and the pick of the administrative posts for the classical training. Science and research are to have those rejected as unfit in this sublime progress of the elect. Instead of our boys—I mean the boys destined for real philosophy, living literatures, science, and the study of actual social and political questions—having a straightforward, well-planned

school course, they are to be *tried over* at Greek for just the most precious years educationally, and our modern world is to have the broken fragments. This claim is pressed even more impudently by Mr. Livingstone in his recent "Defense of Classical Education." He insists that all our sons are to be muddled about with by the teachers of Greek up to at least the opening of the university stage, entirely in the interests of Greek scholarship. Professor Keeble's dream of "sweet reasonableness" is a mere dream. These classical people are absolutely ignorant of their own limitations; they can imagine no compromise; they mean to ram compulsory Greek down the throat of every able English boy they can catch, and they mean to load the scales in favor of Greek at any cost to science, philosophy and national well-being.—H. G. Wells in *Nature*.

#### SCIENTIFIC BOOKS

*Human Physiology*. By PERCY G. STILES. Philadelphia, W. B. Saunders Company, 1916. Pp. 405.

The announcement in the preface, the "purpose is to present concisely the accepted facts with only a limited description of the experiments by which these facts have been established," gives an idea of the scope and nature of the book. There is the further qualification that books of this sort are at fault if they do not make it plain that "unsettled questions confront the investigator at every turn."

Little of historical importance is mentioned, the omission being purposeful. It is an open question in the mind of the reviewer whether the student should not have some knowledge of the history of science as well as of wars and "low ambition and the pride of kings." If necessary, low ambition could be found in the history of science.

While strongly inclined to view with great charity the author's confession of a feeling akin to guilt because he has not acknowledged all the illuminating ideas and happy teaching devices which he owes to his contemporaries, the reviewer can not wholly suppress

the wish that such a feeling might become highly contagious and assume a grave form among authors of text-books and the writers of papers generally. The full acknowledgment of such obligations might dim individual brilliance at times, but science would not be the loser thereby. The author's "atone-ment" might have been more complete if he had included the works of Ott, Stewart and Tigerstedt (English translation) in the list of collateral readings at the end of the book.

In the brief statements of a historical nature on pages 15 and 16, one finds but little mention of the influence of French investigators in physiology. A statement of Professor Howell is so pertinent in this connection that I venture to quote it.

The establishment of physiology as an experimental science is usually attributed to Johannes Müller and his pupils or their contemporaries who fell under his influence. But as I read its history, its modern characteristics, whether for good or for evil, owe their origin as much to the French as to the German school. Johannes Müller himself was not preeminent as an experimenter—he made use of anatomical rather than physiological methods; but his contemporary Magendie was a typical modern physiologist, and whatever may have been the extent of his personal influence during life, there can be no question that his methods of work and his points of view are the ones that were subsequently adopted in physiology.

On this point, the reviewer is in full agreement with Howell. In the present world conflict of ideals and ideas, even such minor considerations as these should not be wholly lost sight of.

One departure from the usual method of treatment is found on page 95. In the legend of Fig. 22 the author states that the coordinating center for the reflex, a part of whose path is shown, is left undetermined. Evidence is accumulating that the location of the coordinating center for a reflex varies for different reflexes in the same animal, and for a reflex of essentially the same nature in different species of animals.

One might take exception to the statement on page 116 that "We are not usually aware of the nerve currents that arrive in the cen-